TetrUSS for Mac OS X
Version 010804 Release Notes
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Note: This software was developed by the U.S. Government and is for authorized users of Mac OS X TetrUSS only. Unauthorized use, dissemination, or export of this software is a violation of federal law.

System Requirements

TetrUSS version 010804 requires Mac OS X 10.3.x. A three button mouse is recommended for GTC, VGRID OpenGL, and POSTGRID OpenGL (these applications do support three button mouse emulation using control-click and option-click if a three button mouse is not available). If you have mouse driver software installed, be sure that the buttons are set to the system defaults for a three button mouse so that they will not conflict with TetrUSS (note: mouse driver software is NOT required under Mac OS X). Based on testing, an nVidia or ATI Radeon video card with 32MB of VRAM or better (ie, a Quartz Extreme capable system) is recommended for best performance in VGRID OpenGL, POSTGRID OpenGL, and GTC. The software will run on older video cards, however, graphics performance may be poor.

Installation

Before installing TetrUSS version 010804, manually remove any existing TetrUSS folder from /Applications. To install TetrUSS, double click on the "TetrUSS.pkg" file. An admin password is required. The installer will create a folder called "TetrUSS" inside /Applications. To install AquaTerm (required for the histPLOT utility), double click on the "AquaTerm.pkg" file. An admin password is required. The installer will put AquaTerm inside /Applications. After the installers run, the following additional step must be performed:

Add /Applications/TetrUSS/bin/ to your path. Note that Mac OS X 10.3.x defaults to the bash shell for new user accounts unless you have specified otherwise (or have an account carried over from a previous install of OS X). To find out what shell you're using, you can type "echo $SHELL" at the command line and hit return.

For bash, manually add the following commands to a ".bash_profile" file in the home directory of each user that wants to run TetrUSS:

```
export TETRUSS=/Applications/TetrUSS
export PATH=$PATH:$TETRUSS/bin
```

For tcsh (previous default in OS X before 10.3.x) or csh shells, manually add the following to the ".tcshrc" or ".cshrc" (respectively) file in the home directory of each user that wants to run TetrUSS:

```
setenv TETRUSS /Applications/TetrUSS
set path = ($TETRUSS/bin $path)
```

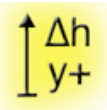
For other shells, use equivalent commands to put /Applications/TetrUSS/bin/ in your path.

Description of Software

Note: the following descriptions are used:

application = Native OS X Cocoa Application
droplet = OS X Droplet
CL = command line executable

Some applications can be run/launched in more than one way. The version number (equivalent to the original TetrUSS software) is given where applicable. Known issues and bugs are listed below (and workarounds are given where applicable). **The software is being improved and bugs are being fixed on a continual basis. If you find any new bugs or issues, please report them!**



BL Spacing (application)

A turbulent boundary layer spacing calculator. Plug in Reynolds number, reference length, y+ for first node point, number of points in the boundary layer, and the Rate 2 parameter, and the calculator will compute the first cell height and Rate 1 parameters for input into GTC.

Known Issues: None.

Major Changes: None.

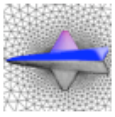
GridToolCocoa - GTC (application/CL) (version 3.3C)

Double click this app's icon to launch, or type "gtc" at the command line. The interface is similar to the SGI GridTool (note that you gain access to the various panels through the "Window" menu). Users familiar with the SGI software should have no problem using the Mac OS X version.

Please note that this version of GTC will expire on January 1, 2005. An updated version will be available after December 15, 2004.

Known Issues: None. However, be sure to save restart files often so that you will not lose your work if you encounter a bug!

Major Changes: Interface tweaks for 10.3/Panther. GTC has been updated for compatibility with open/save dialogs in 10.3. The status panel has been integrated into the main viewing window and can be resized through a split-view. The project name field and an expanded I/O status panel have also been added to the main window. The faster (wireframe) graphics option is now on by default, and can be toggled from the Viewing Controls panel (pressing shift continues to toggle this on the fly).



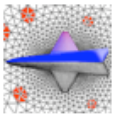
VGRID OpenGL (droplet/CL) (version 3.3)

Drag a file from your project (ie, projname.d3m, projname.mapbc, etc...) onto the VGRID OpenGL icon in the finder or dock to launch VGRID. Alternately, type "vgrid" or "vgrid -i projname" (where projname is the name of your d3m project) at the command line. You may also use the "VGRID" button from the Grid Generation panel of GTC.

Users familiar with the SGI software should have no problem using the Mac OS X version. Use "s" to switch between "background" and "on the fly" modes during generation instead of "Ctrl" as on SGI. Also, note that the appearance of a "?" in the GLUT interface indicates that the user needs to right-click the mouse to popup a menu (these do not appear automatically in GLUT).

Known Issues: Some minor graphics glitches may appear on older systems with graphics cards that are not Quartz Extreme capable. Occasionally, the GLUT "?" menu prompt may not appear to indicate that a right-click is necessary. Display of surface vectors has not been implemented in this version (but will be added at a later date).

Major Changes: None.



POSTGRID OpenGL (droplet/CL) (version 3.3)

Drag a file from your project (ie, projname.d3m, projname.mapbc, etc...) onto the POSTGRID OpenGL icon in the finder or dock to launch POSTGRID. Alternately, type "postgrid" or "postgrid -i projname" (where projname is the name of your d3m project) at the command line for interactive runs. You may also use the "POSTGRID" button from the Grid Generation panel of GTC.

Users familiar with the SGI software should have no problem using the Mac OS X version. Note that the appearance of a "?" in the GLUT interface indicates that the user needs to right-click the mouse to popup a menu (these do not appear automatically in GLUT).

Known Issues: Some minor graphics glitches may appear on older systems with graphics cards that are not Quartz Extreme capable. Occasionally, the GLUT "?" menu prompt may not appear to indicate that a right-click is necessary.

Major Changes: None.

Projector (droplet/CL) (version 3.3)

Drag a file from your project (ie, projname.cogsg, projname.mapbc, etc...) onto the Projector icon in the finder or dock to run Projector. Alternately, type "projector projname" (where projname is the name of your d3m project) at the command line. You may also use the "Projector" button from the Grid Generation panel of GTC.

Known Issues: None.

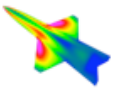
Major Changes: New version of the NURBS library has been used.

Preface (droplet/CL) (version 4.2)

Drag a file from your project (ie, projname.cogsg, projname.mapbc, etc...) onto the Preface icon in the finder or dock to run Preface. Alternately, type "preface projname" (where projname is the name of your d3m project) at the command line.

Known Issues: None.

Major Changes: None.



USM3D (droplet/CL) (version 5.2)

Drag a file from your project (ie, projname.cogsg, projname.inpt, etc...) onto the USM3D icon in the finder or dock to run USM3D. Single or double precision options can be set by launching the USM3D droplet before doing drag and drop. This preference will be saved when the USM3D app quits, and used on the next drag and drop launch. Alternately, type "usm3d.r4 projname" (where projname is the name of your d3m project) at the command line for single precision runs, or "usm3d.r8 projname" for double precision runs. Be sure to have enough free RAM before running USM3D. You can type "usm3d.r4 -s projname" or "usm3d.r8 -s projname" at the command line to check on memory requirements before running the code. Some general memory guidelines are given below:

Grid Size (Cells)	Single Precision Memory (MB)	Double Precision Memory (MB)
100000	72	144
500000	360	720
1000000	720	1440
2000000	1440	2880
3000000	2160	4320
5000000	3600	7200
10000000	7200	14400

The OS X version of USM3D is currently not accelerated for G4/G5 or multiple processors. These features may be added in a future release. Note that the USM3D flow solver is also available in parallel and single-CPU versions for other platforms including Cray, SGI, Sun, Alpha-Linux, and Intel-Linux. For faster turnaround or the capability to tackle larger problems, USM3D can be run on cluster or supercomputer systems.

Known Issues: None.

Major Changes: None.

histPLOT (droplet/CL)

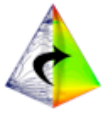
Drag a USM3D "hist.plt" file onto the histPLOT icon in the finder or dock to quickly plot the convergence history. This requires the installation of AquaTerm in the Applications folder. Note that histPLOT can also be run from the command line. Just type "histplot" in the directory that contains the hist.plt file. By default, histPLOT will auto-scale all plots and plot every other point. If a text file named "hist.cont" is located in the same directory as hist.plt, it will override these settings. The format of hist.cont is:

```
nskip
2
logR/Ro     min     max
1           -4.     1.
CL          min     max
1           0.1     0.5
CD          min     max
0           0.      0.
CDV         min     max
0           0.      0.
Cm          min     max
1           -0.2    0.1
CFL         min     max
0           0.      0.
logT/To     min     max
0           0.      0.
```

Setting nskip will govern how many points are used in the plots (raise nskip for faster rendering, lower nskip for better resolution). The minimum setting for nskip is 1. For manual control of plot limits for the various parameters, set the parameter's flag to 1 (or leave at 0 for auto-scale) and specify min and max limits. Currently, the x-axis range is auto-scale only.

Known Issues: None.

Major Changes: None.



Tet2Tec (application/droplet/CL)

This utility converts TetrUSS solution and project files into Tecplot format. It can be run from the command line (type "tet2tec" at the command line for options) or using the Tet2Tec app/droplet.

Input files required:

.flo file (formatted)
.cogsg file (unformatted)
.bc file (formatted)
.mapbc file (formatted)

Using the command line "tet2tec" utility, filenames can be specified individually, or by project name. Using the app, files can be chosen using the "choose" button, which requires you to choose all four files at the same time (use shift-click and/or command-click to choose multiple files from within the file browser). Using the app in droplet mode, drag and drop the four files onto the Tet2Tec icon in the finder or dock.

Based on the menu options chosen in the app/droplet (which can be set as defaults using the "Set Defaults" button), Tet2Tec will process the input files and create ASCII ".dat" and/or binary ".plt" files in Tecplot format.

For help in the app/droplet, hover the mouse pointer over each control for more details.

Known Issues: Currently, the option to output force and moment maps is not available. The menu option is present in the app/droplet, but will generate errors when run.

Major Changes: Added support to create binary Tecplot ".plt" files without requiring Tecplot or preplot to be installed.

Training

TetrUSS training is offered periodically at NASA Langley Research Center (located in Hampton, Virginia). Currently, class size is limited to about 5 students. Students are responsible for all travel arrangements and expenses.

While we would like to accommodate as many users as possible, TetrUSS training is geared towards our primary user base of engineers and scientists in fluid dynamics, aerospace, and related fields. Therefore, we suggest the following prerequisites for students interested in TetrUSS training:

1. Completion of college-level coursework in fluid dynamics or a related area
2. Familiarity with CAD terminology
3. Basic experience in geometry modeling
4. Basic familiarity with UNIX operating systems

In addition, students should have basic knowledge and appreciation of computational fluid dynamics (CFD). TetrUSS training will not be an introduction to CFD, nor will it teach students the theory and background of CFD. Instead, training is intended to teach novice and expert CFD users how to use TetrUSS and apply it to CFD problems. Therefore, it is critical that students come to the class with at least a basic understanding of CFD.

For questions about training or to sign up for Mac OS X TetrUSS training, contact Craig Hunter by e-mail at: craig.hunter@nasa.gov.

Support

Due to limited resources, we are only able to provide ongoing support to users who have taken the TetrUSS training class. During training, you will be given a list of people to contact for support of the various software components in TetrUSS. These people can help with the use, operation, and application of the software.

For other issues with the Mac OS X TetrUSS software, including installation problems and bug reports, please contact Craig Hunter by e-mail at: craig.hunter@nasa.gov. **Issues should pertain to the TetrUSS software itself; we are unable to answer basic questions regarding OS X, the terminal, or Tecplot.**

Resources on the Web

Main TetrUSS web page:
http://aaac.larc.nasa.gov/tsab/tetruss/

Mac OS X TetrUSS web page:
http://aaac.larc.nasa.gov/tsab/tetruss/mac/

USM3D Online Manual:
http://aaac.larc.nasa.gov/tsab/usm3d/usm3d_52_man.html

GridTool Documentation:
http://geolab.larc.nasa.gov/GridTool/GridTool_Doc.html

GridTool Training Manual:
http://geolab.larc.nasa.gov/GridTool/Training/GridTool/

VGRID Training Manual:
http://geolab.larc.nasa.gov/GridTool/Training/VGRID/

Acknowledgments

The main TetrUSS development team is listed at:

http://aaac.larc.nasa.gov/tsab/tetruss/

GridToolCocoa (GTC), VGRID OpenGL, and POSTGRID OpenGL were developed by Matt Grismer of the Computational Sciences Branch, Air Force Research Laboratory. K.S.Abdol-Hamid of the Configuration Aerodynamics Branch at NASA Langley (CAB) integrated viscous grid generation code from the legacy VGRID and POSTGRID software into VGRID OpenGL and POSTGRID OpenGL. Craig Hunter of CAB maintains GTC and developed BL Spacing, histPLOT, Tet2Tec, and the Cocoa droplet / front ends to VGRID, POSTGRID, Projector, Preface, and USM3D. Steve Massey of Eagle Aeronautics added the Tecplot binary output option to Tet2Tec.